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CHARLES D. MORRIS CARL LIDDLE

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SPEAKING FOR NAVIGATION

By CAPTAIN J. F. HELLWEG, U. S. N.

Superintendent, U. S. Naval Observatory, Washington

INSTEAD of starting with the answer and working your calculations backward to the problem, and then making that jibe with the desired answer—what is called in the Navy a "gun deck sight"—why not be sensible and reverse the operation? Start with your problem, stick to the accepted units, and work progressively to your answer, discarding everything along the way which is not an advantage or an improvement.

If this process is followed in considering calendar reform, it inevitably leads to the 12-month revised calendar, consisting of four equal quarters, each quarter divided into three months, the first month of each quarter having 31 days and the second and third months having 30 days. This form of calendar is The World Calendar, and is the only acceptable form.

The United States Naval Observatory has approved very strongly The World Calendar. Benefits from it are manifold, and the differences from long-established customs are negligible.

When approaching the subject of calendar reform, it must be remembered that any change involving all the nations of the world will require a long period of transition. The plan should therefore be such that no great embarrassment or inconvenience will be entailed if a few reluctant nations withhold ratification for a short or long time. History shows that the Gregorian reform was introduced in 1582, and was not accepted by all important countries for a period of more than 300 years. History also tells us that after the change from the Julian to the Gregorian calendar

in England, there was a very considerable upheaval, so serious that during the next 70 years more than one-third of all the litigation in British courts was the direct result of that change.

Admitting the inadequacies of the present calendar system, all practical men recognize the necessity of reducing all the proposed alterations to a minimum. All proposals for arbitrary changes, such as the 13-month calendar, should be viewed with suspicion.

Much has been written regarding the possible effect of various types of calendar reform on business, on religion, on banking, on agriculture, and on other activities in modern life. Such studies are helpful, and tend to reduce confusions arising from mere generalization. Accordingly the Naval Observatory, applying the reform proposals to the routine of navigation and astronomy, finds that it is unthinkable to complicate the mathematical work of navigators and astronomers by the introduction of a 13-month calendar. In our work, the twelfth of a year is a much more convenient unit than the thirteenth. Mathematically the twelfth is very convenient; the thirteenth, an impossibility. Try to divide 360 degrees into thirteen equal parts and then divide that into twenty-four equal parts and you will be convinced. With the 12-month year, there is a 6-months' difference between seasons in the northern and southern hemispheres; the times of sunrise and sunset are interchanged in 6-month periods; certain astronomical formulas are simplified by the fact that the number of hours in the day is double the number of months in a year; calculations can be made mentally that would require intricate tabulations in a 13-month calendar. Nature divides the year into halves and quarters by the solstices and equinoxes, and these natural units fit poorly into a 13-month calendar.

From the viewpoint of astronomers and navigators, every proposed change except The World Calendar would be impractical and most unfortunate. Any other type of calendar revision would enormously increase our work with no commensurate benefit, and would necessitate the readjustment of our astronomical and navigational tables. The latter is no small task, for these tables are published several years in advance, not only in America, but in all the large countries of the world, and the scrapping of these publications together with their revision into some weird new system would be a colossal labor and an economic crime.

It is an easy matter to propose a change. It is equally easy to parade arguments in its behalf. But the dangers of any revolutionary alteration in a standard of measure so intimately linked to life as the calendar, are so obvious as to preclude the facile acceptance which is sometimes given by the superficial thinkers. It is a fatal mistake to accept the sophism that any change is an improvement. In this matter, we can be sure, hasty decisions will inevitably involve consequences that will be regretted for many long years, consequences that eventually will have to be remedied at

great cost and inconvenience to business, society and all the manifold official and unofficial activities of human life.

The 13-month calendar is a hobby that has attracted certain minds. It is the kind of hobby that becomes an obsession. In this respect it resembles certain other reform projects that have been agitated in the recent past, some of which have unfortunately been tried with resulting conditions entirely different from those previously promised by the militant agitators for reform. The agitators for these reforms have promised us—as do the advocates of a 13-month calendar—the sun, moon and stars; but the adoption of their reforms has frequently left us hanging over a precipice with no place to put our feet. The militant agitator, we have learned to our sorrow, is frequently ruthlessly oblivious to the physical, moral and spiritual catastrophes which are likely to be precipitated by his unsound plans for improvement.

In connection with calendar reform, I recently received a circular from a distinguished Roumanian, Baron Gustav Bedeus, who seeks to save the world from a 13-month year by proposing a calendar in which the quarters are made equal by the employment of a first month of 35 days, or five weeks, followed by two months of 28 days each. The Baron, fascinated by the week as a unit, also provides an extra stabilizing week every five or six years. One of the Baron's principal claims on behalf of his plan is that it enables us to tell the day of the week from the day of the month. This particular standardization is actually of very minor importance as compared with the glaring inequalities which he introduces into the units of months and years.

The Baron is apparently unfamiliar with the proposed 12-month equal-quarter calendar (The World Calendar), for he is very insistent in his literature that the only choice in calendar revision is between the Bedeus plan and the 13-month plan. He states—and correctly, I think—that his plan is better than a 13-month calendar. That is axiomatic. The manifold faults of the 13-month proposal are far greater than those which the Baron proposes. But why take the lesser of two evils when there is a method already widely approved and advocated, which eliminates the evils of both systems without introducing any others?

Frankly, I think it would be jumping from the frying pan into the fire to adopt either the 13-month calendar or the Bedeus plan. Both have as many (or more) irregularities as the existing calendar; and in addition, certain bad psychological aspects, plus an enormous increase of labor in the elementary tasks of time measurement.

My advice to all advocates of calendar revision is to devote their energies to the only proposal which meets all the requirements of the situation, with a minimum of upheaval and disturbance and a maximum of benefits to mankind,—The World Calendar.

TIME HAS COME FOR ACTION

By HAYNE DAVIS

Both at home and abroad, Mr. Davis is known as a leading authority on international law. He was the secretary of the American delegation to the 12th, 13th and 14th Interparliamentary Conferences, and collaborator with the chairman of the American delegation in the preparation of the Resolution of the 12th Conference, upon which President Theodore Roosevelt acted in calling the second Hague Conference. He was counsel to the Minister of the Republic of Colombia in its claim against the United States for the loss of Panama. He is now vice-president of the World Narcotic Defense Association, in charge of the department of official cooperation. He is the author of many articles and monographs on international federation, limitation of armaments and international arbitration in their relation to national security and to international peace and justice.

TIME has arrived, I think, for definite international action on calendar reform. Consultative gatherings of the nations have been held, and have shown a sufficient recognition of the need for revision of the calendar. The next step might well be to move straight into the Council of the League of Nations. I would suggest, therefore:

> A Resolution of the Council of the League of Nations recommending that the nations of the world consider the question of substituting the proposed perpetual World Calendar for the Gregorian calendar on January 1, 1939, and that this substitution take effect in all the activities of the League of Nations on that date:
>
> PROVIDED that a majority of the Assembly of the League of Nations at the 1935 session does not take action to the contrary; and
>
> PROVIDED that all the nations permanently represented in the Council (and also the United States) shall decide in the meantime upon the use of this calendar from and after that date, in the conduct of their own national affairs.

This proposed first step has the advantage of being a tentative, not a definite, act in favor of the change. It is easier to get people to give semi-approval to any plan than to decide definitely to sink or swim on the issue of the resolution then taken. Passage of this resolution would be like making first base in a game of baseball or first score in other sports, which is much easier than a home run in baseball or complete victory in any sport at a single stroke.

Again the resolution proposed, while not committing anybody definitely, does go far enough to put inertia on the side of progress in this particular and delicate matter. Adoption of this resolution by the Council at any time,

would bring the matter into the field of practical politics throughout the world. In every country which is represented in the Assembly, the subject would have to be given careful consideration so that the delegates from that country would not arrive at Geneva for the 1935 session of the Assembly in blissful ignorance of the subject, as most of the people now are and will remain, until something *requires* serious consideration of the subject. The time allowed after the passage of such a resolution by the Council, before action by the Assembly, should be reasonable. The Assembly meets in September each year, and the Council several times annually. Suppose the Council should take action at one of its sessions in the latter part of this year. That would give two years for world wide agitation of the subject before the Assembly would act positively against it, or fail to take any action in 1935. If action by the Council should be deferred until some time in 1934, this would allow a year or more before the final date for action by the Assembly. This would seem a reasonable time for world wide consideration of the subject, prior to the date when the Assembly could veto the resolution of the Council by taking positive action to the contrary.

In this way the proposal would not be blocked through mere inertia in the Assembly, but would be carried into its second phase, unless such a strong sentiment against it should develop that a majority of the Assembly takes action in its 1935 session, vetoing the resolution of the Council.

It seems to me it would be no trespass on the rights of the Assembly for the Council to take this course, though it is not easy to determine who has authority to decide upon choice of a calendar. The League of Nations, under the terms of the Covenant and in accordance with resolutions of its Council or Assembly, has to do certain things at stated times. The League has the right (through action of one or the other or both the Council and the Assembly) to substitute for the existing calendar now in use, another calendar, and to do those things at the times provided in the Covenant, or in its own resolutions, as shown on the *new* calendar instead of on the Gregorian calendar.

It seems to me, however, that nobody else will have authority to require the League of Nations to perform its public acts prescribed to be done at stated times, according to the Gregorian calendar, in case the League preferred to adopt a different calendar for the conduct of its affairs. By coming into existence, it seems to me, the League has acquired a right to deal with the question of the calendar along with the other political bodies of the world previously existent.

The nations who formed the League, by their concurrent action, retain individually the rights they had before to deal with the subject. This proposal recognizes the right of every nation to act in the matter and requires nothing of any nation except that, if the perpetual World Calendar is posi-

tively approved as proposed by the League Council and not vetoed by a majority of the 1935 Assembly, and is positively approved by all the nations permanently represented in the Council during 1938, that nation shall take note, in its dealings with the League and with those members which have adopted the proposed perpetual World Calendar, of the days and months as arranged on *that* calendar, even though for its own affairs it may prefer to retain the calendar at present in use.

Under this proposal freedom is reserved for all concerned to express their opinions on the subject before any change is definitely made, and to continue to act in accordance with their own opinion in their own affairs, regardless of the decisions reached by others, and yet the proposed change will not go into effect for any of those favoring it until it would go into effect among enough of them to make the change a desirable one.

The present nations having permanent membership in the Council of the League, since the resignation of Japan, are France, Germany, Great Britain and Italy. Area and population of these four countries are as follows, including their possessions as well as their home territory.

	Area	Population		
Great Britain	13,106,582 sq. mi.	485,302,900		
France	4,256,808 " "	79,939,300		
Germany	180,000 " "	62,348,800		
Italy	119,744 " "	42,118,800		
			Total	669,709,800
United States	3,026,789 " "	122,776,700		122,776,700
Total population				792,486,500

It hardly seems desirable to figure on the population of the countries having temporary representation in the Council of the League, because the term of all of these countries will expire before definite action is proposed to be taken. However, here is a list of the countries which have temporary representation in the Council, in the order in which their terms will expire: Guatemala, Irish Free State, Norway, Spain, Panama, China, Poland, Mexico, Czechoslovakia. The term of the temporary members is for three years and in all probability none of these nations will be represented in the Council in 1938 or 1939.

The population of the permanent members of the Council and of the United States of America is almost one-half of the population of the world, which is roughly figured as 2,000,000,000. Nations, like individuals, have an interest in the calendar in proportion to the amount of business they do. The nations containing a population of 792,486,500 do a great deal more business than the 1,200,000,000 people inhabiting other countries.

If there is not enough opposition to the adoption of the calendar proposed by The World Calendar Association to pass a resolution at the 1935 session of the Assembly of the League of Nations vetoing the proposed resolution of the Council, it is very probable that there will be enough sentiment in

favor of the proposed calendar to secure its early adoption by a majority of countries in the Assembly, and in due time by all of them.

The nations not now represented in the League are: Afghanistan, Sudan, Arabia, Brazil, Ecuador, Egypt, Soviet Russia, United States of America. As the United States is one of the countries whose positive approval of the proposed change is to be a condition precedent to its going into effect, Russia is the only very populous country that would not have a voice to raise in opposition at the 1935 session of the Assembly of the League. So the probability is that most of the world would join in the adoption of this progressive plan of charting time, in case it is approved by the nations having permanent seats in the Council and by the United States of America on or before July 1, 1938.

The second step in the carrying out of this plan would be action on the Council resolution by the nations having permanent representation in that body—France, Germany, Great Britain and Italy. If the Council adopts the resolution, the men who represented these countries at the Council meeting which took this action, will naturally become the advocates in their own country, of its approval by the properly constituted authority of the nation. This would be natural whether these persons continue till then to represent their country on the Council, or whether they shall have been replaced by others. In the latter case, it might be that the new representative on the Council would also be an advocate of the reformed calendar. This would give double weight to the influence at that capital, from the League of Nations side, in favor of the change. But, even in case they should be on opposite sides, on this question, having one such advocate, at each of these capitals, would ensure The World Calendar a respectful hearing on the subject.

It would be important to have a well thought out plan of campaign, to be conducted in each of these countries, during the period between action by the Council, and the time when the nation would take its action, for going on the new, or for holding to the old way.

Agitation for action by the United States of America should be, in my opinion, the third and last step. This country is not in the League, though the chair for the United States placed in the chamber of the Council by the Covenant is still standing, awaiting the arrival of an accredited and worthy occupant. Until that time, it would seem proper that this country should not be pressed to take the lead in matters initiated by the League, or requiring its action. When the League, itself, and the nations permanently seated at its Council Table, shall have decided that they would like to make use of a better calendar, provided the United States would be good enough to join them in this forward move, the question would come up here in the most auspicious way. The fact of their deferring to us would not militate against our giving consent to the change. Their endeavoring to put this

change into effect without our consent would increase the difficulty of securing the approval of our country.

As the calendar is important to people and nations in direct proportion to the amount of business they transact, the United States is one of the nations most concerned in the adoption of any new system. There is good reason, therefore, for proposing that the League show this consideration to the United States, in addition to the fact that it would not only be a courteous thing to do, but good tactics, in the conduct of the campaign for calendar reform.

When it comes to positive action by the United States, a delicate question of jurisdiction arises, as well as one of policy. There are about as many constituent states in our Union as there are in the League of Nations. How are they to be treated in the decision of the matter? Each of them has, I think, the same and an equal right to act on calendar matters. The United States also has a right to act. There are prescribed days for the election of the electors of President and Vice President, for the electors to vote for a President and Vice President, for the counting of the ballots, for the taking of office by those who are elected, for the election of members of Congress, for the sessions of the Congress, and of the courts.

The United States of America has the legal right to adopt the proposed perpetual World Calendar for the determination of when these specified times arrive, whether any or all of the states accept the new system or cling to the present calendar. All the states have representatives in Congress. If the proposed change were approved by resolution of Congress to go into effect, at a specified time, the probability is that the members of Congress who carry the proposal through that body would be influential enough in their own states to secure early approval of the change by the proper authority of the State.

As it is proposed that the first step by the Council of the League be tentative, subject to veto of the Assembly, so it might be well that the Congress of the United States should be asked to provide for putting the new Calendar into effect, in the conduct of the business of the United States, unless states having a majority of the population of the United States should negative the proposal by a stipulated time. This would again put inertia on the side of progress, and yet give the constituent states a voice in the determination of what the United States does on the adoption of the new chart for Time, in the conduct of the affairs of the United States. If the United States adopted the new calendar, along with the League of Nations, and the principal international trading nations of the world, all of the states will soon follow suit. There would be too many difficulties in endeavoring to consult the Gregorian calendar for state affairs, and to correlate it with the perpetual World Calendar every time action had to be taken in interstate or international affairs.

AS A SCIENTIST SEES IT

By SVANTE ARRHENIUS

Leading European Scientist and Nobel Prize Winner

(Abstracted from a Translation by Dr. Knut Lundmark, Director Royal Observatory, Lund, Sweden)

In a memorandum accompanying this abstract, Dr. Lundmark writes: "The late Professor Arrhenius, one of the founders of the modern science of physical chemistry, took a keen interest in calendar reform, advocating the revision which is known in America as The World Calendar. One of his last important public appearances was a discussion of this subject before the Swedish Astronomical Society. I have summarized parts of his formal address on that occasion, because of its high historical value to the whole calendar reform movement and because of the speaker's eminence in the world of science."

AS MIGHT be expected, objections have been raised against the proposed reform of the calendar. It certainly is a good principle not to give up any old scheme before it has been proved that the new one is better. But the reform which I advocate aims at restoring the lost uniformity in our calendar (which it possessed under Julius Cæsar) and at improving the system very conservatively in certain other respects.

The following four changes are proposed:

1. *Equal Quarters:* A slight rearrangement of the lengths of months, so that the quarters of the year will be as nearly equal in length as it is possible to make them. (The equal quarters will consist of 3 months each, of which the first one will have 31 days and the other two 30 days each. The quarters thus will comprise 13 weeks or 91 days, of which 13 days will be Sundays and 78 weekdays. Each month will have 26 weekdays.)

2. *A Perpetual Calendar:* The last day of the year, now December 31, is to be set apart and not counted as a weekday. The same treatment in leap year will be applied to leap day, now February 29, which for reasons of symmetry will be appended to June.

3. *Stabilization of Easter:* Easter will be given a permanent, fixed date, April 8, which has been the average date in our present calendar.

4. *Change in Beginning of Year:* This change is not as important as the others. It is based on the argument that as the astronomical and civil day begins at midnight, so the year should begin at the shortest and darkest time of the year, namely the day following the winter solstice.

The most important of these reforms is that which eliminates the wandering character of the weekdays, so that a certain day of the week will hereafter always fall on the same day of the month. Next in importance is the rearrangement of the lengths of the months.

Julius Cæsar, in the original enactment of his calendar, specified that the twelve months should have alternately 31 and 30 days. The first month

of the year, which was traditionally March, had 31 days. April had 30, May 31, June 30, July 31, August 30, September 31, and so on. Of course this scheme was strictly applicable only to leap years, which have the requisite 366 days. During ordinary years, therefore, the last day of the year was dropped, and as February was the last month of the year, it had only 29 days in ordinary years.

In the year 44 Cæsar's adopted son, Augustus, decided to declare both Cæsar and himself deities, and in order to honor the new deities the names of the months Quintilis and Sextilis were later changed to July and August. Then, to be sure that the two deities were on a basis of exact equality, Augustus added a day to August, taking the day away from the end of the year, and thereby cutting February down to 28 days. Another little complication was similarly dealt with: now that Sextilis had 31 days, September and November were changed into 30-day months, while October and December were moved into the 31-day column. Certainly this Augustan change was a backward kind of reform, which did not reflect credit or honor upon the new deity.

As a result, the first half of our present calendar year has 181 days, and the second half has 184 days—a difference of 1.7 per cent. And certainly there is no reason why the world should any longer tolerate an arrangement in which one month, February, is 9 per cent shorter than the average length of the other months.

The new calendar should be arranged as follows: An ordinary year will have 52 weeks, plus an extra day, not counted in the week-day progression. Each quarter will have 91 days, except that the last one will include the extra-calendrial day, a holiday. Each quarter will thus have precisely 13 weeks, beginning on a Sunday. The first month of each quarter will have 31 days and the two succeeding months will have 30 days each. The number of weekdays in each month of the year is thus exactly 26. January 1 is always Sunday, and because of this fact each date in the calendar will always thereafter correspond to a certain weekday.

Perhaps the most important argument brought up against this proposal is that "the reform involves such small changes that it is hardly worth the trouble of enacting it." But such an argument is not very plausible. How much labor our present calendar irregularities cause us, may be illustrated if we think of the time and effort which all mankind puts into teaching and learning the verse: "Thirty days hath September, April, June and November; February twenty-eight alone; all the rest have thirty-one." Every one of us has lifelong trouble in remembering and applying this verse correctly—or incorrectly.

To me, also, it seems a sort of duty upon the race to remove the deteriorations of the Julian calendar which are due to the vanity of Augustus. There are really no relevant objections to such a correction.

If one wants a clear illustration of the irrationality of the present division of the months, it is enough to recall the present method employed by Swedish bankers for computing interest. Each month is considered as having 30 days. And thus the interest year contains only 360 days. The difference is quite important to the individual who pays interest on such a basis. February has 28 days, and January 31. Thus February is 10 per cent shorter than January. If a loan or a bond is on a 4½ per cent basis, the annual interest during February is 5 per cent.

Another example: An official, who is usually salaried for each month, receives the same amount in February as in January, in spite of the fact that the former month is 10 per cent shorter than the latter. If the salary is large, the amount becomes a figure which is far from negligible, and if many salaries are bulked into a payroll, the percentage is likely to become very important. In our purchases and sales of ordinary merchandise, the measures of weights and quantities are kept correct to a small fraction of one per cent; why, then, should we be content to have the measures by which we pay wages and salaries variable by more than 4 or 5 per cent? The very nature of the Julian-Gregorian calendar prevents us from making the 12 months of precisely equal length, but months should not differ by more than one day from each other. Adopting this principle, we find it easy to equalize the lengths of the quarters, which is of enormous statistical advantage, and also important in such matters of everyday life as the payment of house rents, farm rents and certain wage arrangements.

As a corollary to calendar reform it has been proposed that a rearrangement of holidays will become possible, whereby most holidays can be brought into a position adjoining the week-end. Reforms of this kind, however, are national affairs which can be taken up at any time after the general reform has been adopted. In Sweden the holidays are very badly distributed through the calendar year, all of them falling within the six-months period between December 25 and June 24.

As to the problems of the transition from the old to the new calendar systems, the Swedish Academy of Sciences has appointed a committee to discuss measures to be taken to insure that the inconveniences of the change shall be as slight as possible. Among the situations which they have considered are such legal matters as statutes of limitations on debts and other obligations, the lapsing of patents and copyrights, the time limits on pensions, passports, and retirement privileges, laws regarding military service and civil service positions, and similar legal situations. It seems quite clear, however, that a change in the calendar which will not alter the incidence of any given day by more than two days can easily be met without causing any serious legal difficulties. In fact, the new calendar will do much to clarify law and prevent the involved legal language which is now often necessary in order to define the words month and year.

AS TAUGHT IN THE SCHOOLS

By Julia M. Martin

As a presentation of calendar reform for school children, Miss Martin has prepared this article in dialogue form. It has been used effectively in Spokane, and Miss Martin suggests that teachers in other cities may find the same presentation useful and interesting for their classes. As a subject for essays by High School students, the calendar may be approached from a variety of angles, such as history, holidays, plans for reform, and the effect of calendar irregularities on various occupations, trades or professions. Many schools have found the calendar an excellent subject for debate, and it is of course an ideal exercise in research.

"UNCLE, what's this plan for a new World Calendar?"

"Why, this, Bob: By making very slight changes in the present calendar, we could have 26 week days in every month of the 12, and no month longer than another by more than one day; whereas now, as you know, February is three days or two days shorter than other months. The quarters and halves of the year, too, would be better equalized; whereas now the quarters vary from 90 to 92 days, and one half of the year is three days longer than the other. By the new plan, the first month of each quarter would have 31 days, with its five Sundays; the second and third month of each quarter would each have 30 days."

"That would be easy to learn," sighed Bob's sister, who was always trying to think whether it was October or November that had 30 days.

"Yes—easy for children and nations to learn. A still better feature of it is, The World Calendar would be perpetual, and not a different calendar every year, as we now have. Every quarter would come in always on Sunday, and end always on Saturday."

"I don't see how they could do it," said Bob, with the lofty attitude of a High School senior, "for 365 won't divide by seven. There would always be the one left-over day that starts the year on a different day of the week each time."

"That's an intelligent criticism. But this is how they would do it. As Bob suggests, 364 is divisible by seven, but the left-over 365th day overthrows the calendar every year. The new plan would correct that, for the left-over day at the year's end—which would follow a Saturday always—would be called an extra Saturday. Thus the year would start off on the right foot, or in other words, could begin on the same day always. The extra Saturday could be granted as a holiday, since New Year's day would follow on a Sunday."

"Gives an extra day to take inventories," said Bob.

"Yes, and also to get out bank statements and other annual reports.

It so happens, too, that Christmas would come on Monday—so that both at Christmas and New Year the absent employed would have two free days to reach home or friends, which can not occur when these holidays fall, as now, often on some day mid-week. . . . There would be another advantage. Those holidays that have a fixed day of the week would under the new plan have also a fixed day of the year."

"Like Thanksgiving, uncle?"

"Yes, and Labor day, and Easter, and Mother's day. Easter, which now varies in date as much as a month, could be fixed at April 8, the Sunday following the historic actual date of the crucifixion. For after all, what has the change of the moon to do with that anniversary?"

"What would they do with Leap year, uncle?"

"Leap day, in the years when it occurs, would close the month of June and be an extra Saturday, like that which closes December. This would be a convenient time for the extra day to occur, since the fiscal year and the semi-annual business statement end with June."

"Also, placing Leap day on that date exactly balances the two halves of the year," said Bob.

"Yes, perfectly. In short, in the proposed World Calendar, with its uniform month of 26 week days, it would be simpler to compare statistics from month to month—such as factory output, sales receipts and wage earnings. Even for health statistics, interest earnings, monthly rainfall, school attendance and the like, the months and the quarters would be more nearly equal in length and comparable than now. Understand, children, I wish neither to make you friends or foes of the plan; I merely have told you what it is. Many scientific and learned societies, many business organizations, favor adopting some calendar not so clumsy as that we have. Several plans are now before the League of Nations, of which, in my humble judgment, The World Calendar is far the best.

"Within the past 60 years, nations that hitherto had their own calendars have shown a disposition to conform with some calendar in widespread usage. Seven such nations recently adopted the calendar we use, irregular and unhandy though it is; but one of them—Russia—found it too inconvenient, and now uses a new calendar all her own. So the question is, now that nations intermingle in commerce, communication and travel, would they not better, while disposed to adopt one uniform calendar, adopt one as perfect, simple and regular as possible?"

"But it wouldn't be easy to make the change, would it, uncle?"

"It wouldn't be very difficult if we made it in a year when January 1 falls on Sunday in both the new calendar and the old. It does so in the years 1933 and 1939. In such a year, we could glide into the new calendar on January 1 without having to drop some day of the week out of reckoning. . . . The calendar has been altered before, you know, and that in

times when a world idea traveled more slowly. Nowadays, world news and world concepts travel fast. Air mail, telegraph, newspaper and radio make for quicker worldwide understandings."

"When did our country adopt its present calendar, Uncle Will?"

"It was adopted by Great Britain in our colonial days. Julius Caesar's ancient calendar had been given up by Catholic nations in 1582, for the Gregorian calendar, which we are using today. Germany saw the new one's advantage in 1700; but England and her colonies did not accept it until 1752, a century and a half after the Gregorian calendar was in use among other progressive nations. The result was, when she did adopt it, she had to drop 11 days from reckoning. By putting The World Calendar into effect on the right date, we should avoid that."

"I suppose we'd get used to the new plan," said Lucile.

"Of course!" replied Bob. "As it now is, we have to get used to a new one every year. The World Calendar would be simpler and the same for all the years."

THEATRE MANAGERS URGE REFORM

By C. David Stelling

Secretary of the Rational Calendar Association, London

BRITISH theatrical managers, through their national association, have endorsed calendar reform, principally on the ground that a perpetual calendar would simplify greatly some of the most difficult problems of their profession. In a recent issue of their official journal, considerable space was devoted to a discussion by the Rational Calendar Association of the merits of the two proposals for revising the present calendar. The article says in part:

"The advantages of the 13-month system are obvious. It is radical, complete and logical. It gives a year of absolute uniformity month by month. In fact, it goes the whole hog, and carries reform to its logical conclusion—and like all things and people who do that, it is rather inhuman and uncompromising, being theoretical rather than practical and ignoring the human frailty that dislikes rigid uniformity. More important, it is most upsetting to the accepted tenor of our lives in the changes it requires.

"Moreover, these violent changes involve a number of practical disadvantages. Thirteen is a most unmanageable number, difficult to divide by, impossible to divide into. There would be no such thing, in terms of months, as half a year, and the all-important quarters would be nasty fractions of months. A 13-month year would involve 13 monthly balancings instead of 12—a very considerable addition to the labors of bankers, accountants and treasurers. It would involve many startling innovations, particularly in the dates of popular festivals: the Prince of Wale's birthday would be Sol 6th, Christmas day would always be on Wednesday; Friday the 13th would occur every month forevermore.

"In comparison, the 12-month equal quarter calendar involves few changes in present habits. No extra month is introduced—the length of the present months are simply rearranged into symmetry. Every month has the same number of working days. The year divides exactly into halves and quarters. Christmas falls always on Monday. With the exception of the extra day at the end of the year, none of the outward forms of our present calendar are abolished, nor are any strange novelties like the Sol month forced upon us."

ABORIGINAL CALENDARS

By Russell Lord

Author of "Men of Earth"; Editorial Collaborator with the Grand Duchess Marie in "Education of a Princess", and with Leone B. Moats in "Thunder in Their Veins: A Mexican Memoir."

WE citizens of these United States have been schooled so to think in terms of a New World, and of a young nation, that we seldom consider our *parvenu* status on these shores. That which is taught as ancient history in our schools dwells upon remote events beyond the sea. Little or nothing is said of the ancient American culture, a flowering of this soil which approached, and possibly surpassed, in its day, the vaunted splendors of foreign antiquity.

As careful an appraiser of civilization as Stuart Chase raises the question whether, some five hundred years after Christ, with Europe floundering in the Dark Ages, the Maya Indians of Central America may not well have been the most refined, urbane and scientifically sagacious people on the face of the earth. Lately, excavations of the Carnegie Institute in Yucatan have added evidence in support of such a view. To these findings we shall recur; the immediate purpose of this short article is to outline the general nature of the first American adventures in calendar-making, and to see if there be in the experience anything for our present guidance.

Let me disclaim in advance any sense of authority. Undertaking recently to edit a book on Mexico, I had to do a certain amount of reading on the subject, and discovered almost immediately how cardinal to any understanding of Amerind sources is this question of calendar-making. One of the strongest arguments, for instance, of those who see the American Indian, north and south, as a Mongolian transplanted and adapted, centers around a striking similarity between the ancient American practice of bundling the years into cycles and the same, or pretty much the same, system in ancient China. Those who prefer to consider the American Indian indigenous rejoin that the Mexican Indians worked on a fifty-two year cycle, quite different, and in many ways inferior to the Chinese cycle of sixty years.

We know more about the Aztec calendar, which was operating at the time of the Spanish invasion, than we do about its more refined predecessor, the Mayan calendar. An amateur wandering through reference work, I confess myself frequently puzzled by the downright disagreements of learned men as to the Mayan calendar, but they all agree that it was the outstanding scientific achievement of American aboriginal culture. "The zero year of the Mayan calendar," writes Dr. Roy B. McClure in *The Ohio State University Monthly* for May, 1932, "is our

3373 B. C." Whereas Chase, quoting Spinden, says, "On August 6, in the year 613 B. C. the time record of the Mayas was begun. This is their zero year; it is exact and definite, founded on calculations from lunar and solar eclipses. In order to have started accurate astronomical time on that date, Spinden and Blom believe that the Mayas began studying the stars no later than 2000 B. C. It would take as long as that to work out a calendar."

In the seventh century of the Christian era the Mayas emigrated from Guatemala to Yucatan. A hundred years later the Toltecs, a tributary tribe, were on the Mexican plateau. But now Mayan grandeur declined, and the inheritors of that grandeur were the Aztecs, or Mexican Indians. With a derivative calendar and customs, they dominated Mexico.

The year 1091 is the zero year of the Aztec calendar. Mexico City, their capital, a mountain Venice, with shining palaces and waterways, was established in 1325. It was sacked and taken by the stout Cortes and his ruffian *conquistadores* in 1519. In the long harsh years that followed, feudalism, dead in Europe, had in Mexico a new life. Perspiring priests baptised natives in batches of hundreds and thousands. Aztec idols were rolled from the pyramids and smashed. Invaluable Aztec manuscripts were burned. The whole ancient Indian heritage of the Americas was overthrown and so far as possible destroyed.

Yet so enduring is that heritage in the mind and heart of the Indian that Frans Blom, in the course of recent archæological explorations, saw native Guatemalan priests secretly counting the ancient Mayan calendar with red seeds as markers. This Mayan calendar, squared to the four seasons by astronomers who worked without telescopes, was made so accurate that it lost only one day, says McClure, in 374,000 years. It measured time in *katuns*, 20-year cycles; the records were kept by the priests. Basically, the calendar was their count of the days, in groups of twenty, and then of years, in a "bundle" of twenty. A great many efforts have been made to show some primary relation between these cycles and lunar manifestations, or again to such natural phenomena as the duration of human pregnancy (thirteen 20-day months, or 260 days, approximates that period). The actual mathematical analogy seems simpler: Ancient Americans, like ourselves, had ten fingers and ten toes. They chose to count on both fingers and toes rather than on fingers alone. The whole numeric system of the Mayans (which embraced also the conception and use of Zero) was so framed. Notably, also, the figure 20 could be quartered.

The derived calendar of the ruder Aztecs similarly ticked off the days in groups of twenty, dividing these twenty days into four five-day weeks. The fifth day was given over to rest, sport and marketing. There were 18 months. Now, 18 months of 20 days accounts only for 360 days. To adjust their civil year to the solar year, Aztecs added five supplementary days. These five days were of no month and were supposed to be particu-

larly unlucky; about all that could be said for the arrangement is that it rounded out the year to 365 days. But there were still that extra six hours or so, against which today we provide by Leap Years. The Aztecs let a whole cycle of fifty-two years go by before taking up the slack. Gama, the eminent Mexican archæologist, has it that, since a thirteen-day intercalation at the end of that period would be too much, and twelve days too little, the curious intercalation ceremonies of the Aztecs ended alternately at midnight and noon. Prescott, in his monumental *Conquest of Mexico*, accepts this view. "The shorter period of twelve and a half days," he says, "brought them within an almost imperceptible fraction to the exact length of the tropical year, as established by the most accurate observations. Indeed, the intercalation of twenty-five days in every hundred and four years shows a nicer adjustment of civil to solar time than is presented by any European calendar.

"The ancient Etruscans arranged their calendar in cycles of 110 solar years. . . . The early Romans had not wit enough to avail themselves of this accurate measurement, which came within nine minutes of the true time. . . . The Julian reform erred as much, or rather more on the other side. And when the Europeans who adopted this calendar landed in Mexico, their reckoning was nearly eleven days in advance of the exact time—or in other words, of the reckoning of the barbarous Aztecs."

For all the oddity and the inconvenience of the five extra or "Empty Days" a year, and the twelve-and-a-half-day blank spaces between cycles, the system had its points. The twenty days of the month were indicated by as many endlessly repeating signs; the first day of the year fell always under one of four of these signs: a house, a rabbit, a reed, or a flint; and these signs, says Alexander, "inevitably became emphasized in the imagination . . . with the quarters which divide the world." The calendar was of the earth, rather than attuned, primarily, to remoter planets; and this, for a civilization wholly agricultural, was appropriate. It served very well, so far as we can gather, until the Aztec priests insisted on superimposing upon it a calendar of their own. "This was called," relates Prescott, "a lunar calendar, though nowise accommodated to the revolutions of the moon. . . . Their astrological year was divided into months of thirteen days; there were thirteen years in their indictions, which contained each three hundred and sixty-five periods of thirteen days. By means of this calendar the Aztec priests kept their own records, regulated the festival seasons of sacrifice, and made all their astrological calculations. . . . How many ages have rolled away in which great powers have been wasted on brilliant but barren reveries on alchemy and astrology!"

Over no other civilized people did the priests, in time, gain more complete ascendency. The cult of human sacrifice accompanied the structure of Aztec society to its peak and crashing fall. These sacrifices attained

to their utmost frenzy at the end of the fifty-two-year cycle (four times thirteen), when the Pleiades came riding over a certain sacred hill. "Then," writes Prescott, "the people abandoned themselves to despair, breaking their household idols and furniture, tearing up their clothes, letting all their fires go out." The five Empty Days of this last—as of all—years in the cycle, fell in the dreary winter solstice. The priests cast doubt as to whether the cycles of time would be renewed. On the last of the Empty Days the priests moved up the mountain, carrying with them a living victim of noble birth. All waited tensely; then as Pleiades at midnight appeared at the zenith, a new fire was kindled by means of sticks placed on the wounded breast of the victim. This flame was communicated to a funeral pyre on which the sacrificed body was thrown. When the people saw that flame, it told them that life was to go on into another cycle, and for the next thirteen days they celebrated wildly.

From such perversions of a chronology first established by intent observation and triumphant reason let us return briefly to sources; most notably, to the earth, the march of the seasons, and the planting and taking of crops for man's sustenance. Undoubtedly, says Sylvanus Griswold Morley, in charge of the Carnegie excavations of Mayan ruins in Yucatan, the first American calendar was seasonal and agricultural. Because of agriculture, the priests early turned to the accurate measurement of time. Then: "A whole new pantheon gradually developed out of current conceptions of crop germination and fertility . . . new rites . . . a new religion . . . and a new formal architecture."

Recently unearthed at Chichen Itza, in Yucatan, is a dome-like Mayan observatory tower, in outline remarkably like those modern observatories one sees on college campuses. Here, however, were no telescopes; long slits are cut through the circular wall at the top of the building in many different directions. One such slit bisects the sun on the longest day of the year; another bisects it on the shortest day; and so on. Thus Mayan observations were taken, by day and night. Even more remarkably, Frans Blom uncovered at Uaxactun in 1924 a triangular arrangement of temples and pyramids that is, in effect, a vast sundial.

With mathematical precision, then, the first known American calendar was quartered to the unalterable realities of the soil and the four seasons. No calendar which discards the quarterly division of the year can be acceptable to the agricultural base of the population, even today. From the subsequent experience of the Aztecs, the inconvenience and confusion which attends the arbitrary introduction of odd and mystic numbers stands forth plain. Thirteen is not a number that accords with the march of the seasons, nor has it the vital quality of divisibility. On the other hand, the 12-month calendar observes the astronomical quarterly units and conforms with usages to which the race has long been accustomed.

STORY OF THE CALENDAR

By David Thibault

This is the second of a series of articles in which the author traces the evolution of the calendar from its earliest beginnings to the present time. His studies aim particularly to draw from this evolution the conclusions which are most important in the current discussions. Continuation of his studies will appear in future issues.

IV

DURING the latter ages of pre-history, superstition seized upon the calendar and left scars that man has never yet been able to remove. Many of the problems which calendar science faces today are the result of this period of darkness and ignorance. Nor is the survival particularly strange, in view of the fact that recent studies at Columbia University have shown that 98 per cent of all present-day people are influenced by such superstitions as black cats, broken mirrors, Friday-the-thirteenth, four-leafed clovers, lucky charms and evil omens.

Most of these superstitions can be traced back to primitive man. He thought of himself as being in an unfriendly world, and for his own safety he sought friendly powers in the realm of the supernatural. Even though the customs upon which the superstitions were founded have been outgrown, the superstitions themselves have remained, for timid people are afraid to abandon them.

Our calendar superstitions have been handed down to us, then, through countless generations. They are older than any living race. They are built out of the first thoughts which bewildered primitive man.

Our race has not always dominated the other earth creatures. Thus many magical practices which survive today have to do with warding off evil spirits, protection of life and property. That is the imprint of the dim, hazardous past, when, as Worthington Smith has pointed out, "Man was probably the hunted rather than the hunter."

The peril daily run under these conditions soon taught man that life was not only a hazard, but that it teemed with unexpected happenings, good and evil. And since these came about with no conscious intervention upon his part, often despite his best efforts, he began to believe in the supernatural agencies. It is ironic but true, that superstition, as we call it, is in reality the outgrowth of the very first efforts at studying natural science. Early man was a keen observer who lacked knowledge; and he lacked, at that time, ability to coordinate knowledge even had he had a great deal of it.

Note how the association of ideas weaves itself into superstitious belief: The farmer who wishes his corn to escape drought, pitches the

cobs of his seed corn into water. To keep out an evil spirit, bury a talisman at your gate. And of course in fetish practice an enemy can, supposedly, be discomforted or killed by making of him an image, and mistreating this image in the way the practitioner wishes to mistreat the original.

Was there a rational foundation for the early superstitions? Yes. Rational in that they were logically predicated upon what was accepted as fact at the time. Primitive man would find game plentiful one day; the next, under like conditions, he would find no game. He would remember then, that on the lucky day he had performed certain acts. He would not know enough about natural laws to find explanation in the habits of the animals he hunted. He might conclude then, and for him logically, that the act he performed upon the day of plenty was the governing factor. He would then make that act a ritual, and go through with it before going out upon any hunting expedition.

A like body of beliefs might spring up about the business of finding fruits, seeking shelter, making love, making war. And of course when the systematic practice of agriculture concentrated attention even more closely upon study of signs and seasons, superstition, belief in magic and in expiatory sacrifice received tremendous impetus.

Man began farming, some archeologists believe, in the beginning of the Neolithic Age between fifteen and eighteen thousand years ago. Drawings of fig culture found in the pyramid of Gizeh are supposed to be 4,000 years old; and it is nearly certain that for centuries before that time Egyptians had cultivated crops. Agriculture in China and Mesopotamia is equally ancient. The most important and useful crops, such as maize, rice, sweet potatoes, the potato, dates, cereals, millets, sorghums and the banana, have been cultivated for perhaps six thousand years.

With agriculture came careful study of the calendrial problems of seasons and planting time. Having no weather bureau to compile statistics and make predictions for him, man could not know positively how one season might vary from another. It is known that very early he located the seasons in the circle of the year, by observing the position of the sun, and of certain stars. Doubtless those first farmers planted by such signs. The variations in temperature and weather conditions which we know to be the vagaries of the seasons, he would attribute to the evil or beneficent influence of spirits of gods.

Since his time-reckoning in days and seasons was derived from the heavenly bodies—sun, moon, and certain stars—he came early to associate these luminaries with good or evil influences. From that it was but a step to making the stars themselves gods, with powers over human destiny. Thus came the close tie-up between the beginnings of religion and the beginnings of calendar-science.

Now certain men would observe more keenly than others, and remember

recurrence of these signs more accurately. Or perhaps through industry and care they would get better results in farming, in fighting, in love-making, in shelter finding, than would their fellows. As soon as early savagery was over and communal living, even on a tribal basis, began, these men would be looked up to—consulted.

They were the first scientists—the first priests.

Charlatans? Humbugs? By no means. They believed very strongly in their own rites, their own predictions, their own incantations.

Doubtless practicers of magic of all times have occasionally laughed behind their hands at some phases of human credulity, but usually they are completely sincere. That is why they have wielded such influence for good and evil, all along through the vivid history of mankind.

But how could they hold their power, since, sincere or not, they were grossly ignorant of the very matters they explained, and the natural powers they invoked? Human credulity is the answer. Human credulity and the fact that one positive result will cancel many negative ones. The magician, sincerely or in self defense, can explain his failures, and they are soon forgotten. But even the sceptics can't laugh off his brilliant successes. And, of course, there would be more successes than failures because of the nature of the case. Example: Farmers seek a charm to make their seeds sprout, their plants grow.

The priest-scientist, out of his knowledge of the calendar, gives them the best agricultural advice available, and a charm. The seasons do the rest. Or a man seeks a love-charm. Already he has the will-to-victory which is quite important in such cases. This is built up, and his self-confidence enhanced by the assurance of success given by the magician. The outcome—which probably was never in doubt—is inevitable. A war chief seeking victory-magic would be affected in about the same way.

So we find human destiny, calendar-science and superstitious dominance inextricably mixed up in those early times. How these knowing ones who studied stars and the world about them seized power and earned dominance over their fellows, made up the world's history for six thousand years. But first they had to put their knowledge together and organize it.

V

Facts which science continues to gather about the youth of the world fully bear out Mr. Kipling's poetic appraisal: "When in this world's unpleasing youth our god-like race began, the longest arm, the sharpest tooth, gave man control of man." But long arm, sharp tooth, early yielded place to cunning brain. We have seen how the men-who-knew began to dominate the rude civilization of primitive community life.

At first these men made no effort to organize their knowledge, or to pass it on. They didn't know how. Undoubtedly they were, to begin with,

merely lucky, cunning ones who knew how to capitalize luck. Perhaps a man possessed unsurpassed skill with spear or bow. He might gain reputation as a magician who knew charms which would insure accuracy with these weapons. An unusually successful planter might be consulted, even rewarded, for telling the secret of his ability.

Thus might have been the beginnings of the dominance of knowledge. Then comes the next great step, and men began to study and to classify the observations they had made of the signs which seemed to influence their lot for good or evil. Before articulate speech this was a mere blind groping. But when one could communicate with another, knowledge spread rapidly. When the first crude picture writing was invented, then man could not only hand his knowledge to his neighbor, but also preserve it for his children's use after his own death. Then indeed came a quickening progress.

But long before there was any adequate writing, man was passing his knowledge along from generation to generation by speech. Some of what he knew he would tell to any who would listen; some he reserved for his closest friends; some nuggets of secret wisdom he kept to himself. But it is his nature to instruct, improve and reform others. That is the glory and the bane of the creature. He must do it. For gain, for glory, for love of his fellows—it matters little. He must do it.

So from man to man passed general knowledge as soon as articulate speech was achieved by the widened jawbones, the unfettered tongue, that distinguish the man-creature. But the knowing ones who first looked with intelligence upon the stars, and noted the recurrence of sun, moon, and seasons, could tell their special knowledge only to others like themselves—to other knowing ones. Thus intellectual aristocracy was perhaps born before man had emerged from lowest savagery. Proof of it lies in the social status of the medicine men of uncivilized peoples now existing.

A bond of common knowledge sprang up between those who husbanded and increased knowledge. And here let us pause again to remember that these early priest-scientists were not charlatans. They were sincere, they were observant, for their age they were highly intelligent.

Very soon they must have felt the need of what modern manufacturers call "standard practices." They felt the need of it without knowing what it was, of course. Many an unhappy star-gazer or calendar-reader of the dim past must have made rash predictions, must have given his clients the wrong "tip." And remember, he did not have the protection of priestly rank that was to be his later. Furthermore, clients of that day were probably very formidable when disappointed. No suave office boy, no smiling secretary could have appeased them, even had these penalties of civilization existed. No. It is more probable that the disgruntled customer sought some such satisfaction as that which Shylock insisted upon exact-

ing. And there would be no Portia to intervene on behalf of justice.

Because of these things, the early priest-scientists began to codify and standardize their findings. In some cases this would actually make their predictions and auguries more accurate. In all cases it would give consistency to their pronouncements. It would perhaps increase the accuracy of all predictions based upon rational observations of recurrent phenomena. For instance, if the budding of a certain tree had been the calendar guide of one priest-scientist in selecting planting time, and another had merely "picked the date out of the air" as we say, trial and comparison of the two methods would surely lead to adoption of the one founded upon a rational observation of the phenomena associated with sprouting, germination, etc. Such comparisons were not possible until knowledge was organized.

A more common human quality than the love of accuracy also prodded those early priest-scientists into systematizing their predictions and pronouncements. This was the necessity for consistency. "The jewel consistency," observed a strong-minded American philosopher, "is usually paste!" But it is very human of humans to demand consistency in those who prophesy, who see visions, who exhort and lead them. That may account for the slowness of human progress in other than material directions. Be that as it may, ancient soothsayers soon learned that it was best to make the same prediction under like circumstances. To this end system was evolved, and codified traditions built up. Thus began the organization of systematic lore which was swelled to immense proportions by the bearded priests of Babylonia, Assyria, Egypt; by the Greeks, who learned much from the peoples they subjected—and by the Romans, who discovered or made laws for everything. Rome's place will come in calendar history. It is a most important place. But now we must follow the story of the calendar into vast, pillared temples and to the tops of mighty pyramids where white-robed priests gaze upon burning stars set over desert immensity.

VI

It is the early dawn of Midsummer Day, in Egypt, 4,000 years before Christ was born at Bethlehem. In the growing light hushed throngs crowd through the entrance of a temple. The temple is as huge and massive as a hollowed hill. Inside, a forest of fifty-foot columns support the roof. Inward and backward, the temple narrows significantly toward the altar. The dim outline of a seated idol seems to hang above the shrine. In the gloom the image is no more than a deeper shadow among shadows.

The murmur and the movement of the throng is quelled to tense silence. A red shaft of light stabs through the inside darkness. A single ray of the rising sun, like a crimson pointer, reaches through and strikes the jeweled eyes of the grotesque animal-headed god above the shrine. The

murmur swells again, broken by exclamations of joy, of praise. Shouts of devotees and the clash of musical instruments celebrate the miracle.

And miracle it is. Only upon Midsummer Day will the sun thrust through the temple to the animal-headed god. Only one day of all the days in the year can this happen.

What we have witnessed is a splendid bit of showmanship staged by those Egyptian priests of long ago. Back of the overpowering effect was solid knowledge of engineering and astronomy. Without this knowledge it would have been impossible to set down these enormous temples in relation to the heavenly bodies with such complete accuracy that the sun could work its one-day magic.

These ancient temples hold the early history of our calendar. They were the repositories of knowledge, written and traditional. The priest groups were, as we have seen, the active students of natural happenings, and especially of the stars. In such civilizations as those of Babylonia, Assyria and Egypt, and to a slightly smaller degree in those of Greece and Rome, the priest was co-equal if not superior in power to the kingly ruler. Good politics and sound theology suggested, in the course of centuries, closer alliance between king and priest. We find Egyptian rulers deified, and Greek conquerors and Roman adventurers flirting with the idea that rulers are also gods. But the priest and temple, dominating early communities, did more then than mystify the people and deify kings. "The temple in the ancient city," says one writer, "was like the clock and the calendar upon a writing desk." How long has man had this clock and this calendar?

In a cave on the island of Malta one of the earliest temples has been discovered. The little fat images and other works in polished stone give a fair idea of the age of this shrine. Did Neolithic man worship here 5,000 years ago? It is probable. But it is more probable that in Babylonia at that time there were already cities and civilizations and a strong priest group. These priests watched the stars. How intelligently they watched them is apparent when we know that the approximate length of the year as we know it, was known 4,241 years before Christ. In the older cuneiform writings of Babylonia, Saturn, Mercury, Jupiter, Venus and Mars are mentioned. Their power and influence persist in the names of our calendar week days—Saturday, Mercredi, Jeudi, Vendredi and Mardi. In Egypt there is a table of stars on the roofs of the tombs of Rameses VI and Rameses IX. Very early the Egyptians divided the year into days. Their observations were based upon first appearances of certain stars, notably Sirius. What the ancient Egyptians failed to note was that this rising every fourth year comes after 366 instead of 365 days. Eventually this error brought disaster to the Egyptian civil calendar and a new kind of fame to a Roman general.

What did the 6,000 or more years of priestly domination give to the

race of mankind? It bequeathed him his present-day religions. But with that we have nothing to do here. It bequeathed him his present-day sciences, but he has gone so far now that it is difficult to trace the connection in some lines. But in mathematics and astronomy the debt to these ancient priests is very plain. Especially does calendar science owe them much. Their star gazing resulted in good calendars in many lands.

As we have seen, Babylonia, Assyria and Egypt had calendars as early as four or five thousand years before Christ, and probably much earlier. The Chinese were not far behind. We know that from the time of Yao, upward of 2,000 years B. C., they had two different years—a civil year regulated by the moon, and an astronomical year which was based upon observations of the sun. In Central America the ancient Maya civilization produced its own complicated but accurate calendar as early, some think, as 3,300 years before Christ.

In most of these calendars the day, the lunar month, and the solar year were units. The grouping of these units, however, and the arbitrary divisions were often quite different from ours. In some cases they did not even exist. In ancient Egypt, for instance, a year was the longest unit of time-measuring recognized generally, though the priests seem to have worked out cycles of time based upon observations of the constellations. The Chinese divided the year into twelve equal portions corresponding to thirty days, ten hours and thirty minutes. Cycles of sixty days were employed much in the manner that we employ the week—as a convenient grouping of days. Babylonian kings of the First Dynasty forced upon all cities under their sway one calendar which is of especial interest to us. This calendar, adopted by the Assyrians perhaps 2,000 years before Christ, was borrowed from them by the Jews on their return from exile, and was widely used in the Christian era.

The Greeks and Romans borrowed liberally from older civilizations in their temple practices and in their time reckoning. But their activities belong in the following chapter of this story—a chapter in which we shall see calendar-science outgrow the temples and the priests.

Note that throughout all ages and nearly all lands, the number twelve has figured significantly in calendar science. Says H. G. Wells: "Neolithic man was counting, and falling under the spell of numbers. There are savage languages that have no word for any number above five. Some peoples cannot go above two. But Neolithic man in the lands of his origin in Asia and Africa even more than in Europe was already counting his accumulating possessions. He was beginning to use tallies, and wondering at the triangularity of three and the squareness of four, and why some quantities like twelve were easily divided in all sorts of ways, and others, like thirteen, impossible. Twelve became a noble, generous, and familiar number to him, and thirteen rather an outcast and disreputable one."

EXCERPTS AND REVIEWS

Modern Business Methods

By R. B. WALLACE

Associate Editor of the Mid-West Hotel Reporter

HABIT is an arbitrary master. Because we have always used a certain form of calendar, is no evidence that it is complete or satisfactory. In fact, for centuries people have complained of unequal number of days in the various months, of the shifting of important anniversaries, of the lack of fixity in the number of working days in a month.

We call this the year 1933, dating back to the birth of Christ. As a matter of fact we are five years off in our calculation, and this should be the year 1938.

Julius Caesar fixed our present calendar for us, and we have never had the nerve to change it or rectify his errors.

Our calendar is lame in several particulars. The quarters are unequal, 90 days in the first, 91 in the second, 92 in the third and fourth. The two half-years are unequal. Months vary from 28 to 31 days. The weekdays "wander" through the calendar in such an eccentric way that it is impossible for business to compare any series of dates precisely with those of other years. Our statistical comparisons, therefore, become haphazard matters of guesswork adjustments.

Holidays and anniversaries are a cause of confusion and inefficiency, owing to this "wandering" characteristic. Our Thanksgiving day is always on the same weekday, but its numbered place in the month varies with the years. The Fourth of July and Christmas would be much more convenient if, in addition to coming on a fixed month-day, they also were fixed on the most suitable weekday, say Monday or Friday.

The League of Nations has considered action on the need for a new calendar, and has found international sentiment favorable to a change. Two proposals for a new calendar have been referred by the League to the nations of the world, one called The World Calendar, the other the International Fixed Calendar.

The World Calendar is very much like the one used for the past 20 centuries, but it calls for an equal number of days in the four quarters of the year, it "fixes" the weekdays, and it makes the months as nearly equal in length as is possible inside a 12-month year. Under this plan, each quarter will have three months of 31, 30 and 30 days.

It is generally admitted that the 12-month year is the one most readily adapted for calendar needs. The equalizing of the months in The World Calendar commends itself. The first day of January will always be a Sunday, and there will be a complete uniformity and regularity in the other days of the year.

The other proposal, known as the International Fixed plan, offers 13 months of 28 days each. One objection to this plan is that the 13 months are not readily divisible into quarters or half years. The hoodoo of thirteen is also a factor.

Calendar reform finds its principal handicap in mass inertia. Because nations and peoples have got along for 20 centuries on the old system, there is no immediate enthusiasm for change. On the other hand, there is no strong opposition, except from a few people who adhere firmly to tradition and form. One might wonder what such people would do, if making a trip around the world, when they came to the "hole in the bottom of the sea" which is represented by the international date line in the Pacific, where ships lose a day when going toward the rising sun and gain one when the direction is reversed.

Toward Progress

(Extract from Washington *Star*, February, 1933)

PRESUMABLY calendar reform is as old as the calendar itself. Even the earliest of attempts to measure the months and days must have had its critics. Certainly, the Gregorian scheme has been the object of almost continuous agitation. The literature on the subject is both ponderous and various. Literally hundreds of persons have indicted its faults. The difficulty has been that most of the plans of correction have been complicated and confusing, contradictory in character, unscientific in detail if not as a whole.

To the average citizen the whole subject

of calendar correction may appear to be academic. It will be scientists, statisticians, economists and research workers who will look with favor upon any sensible plan for simplifying their labors. To most of these no argument in behalf of the general idea is necessary. Every man or woman, dealing with comparative figures, must have longed for an improvement of the kind indicated.

Life grows increasingly complicated, and any endeavor to oppose that tendency deserves support. The goal of progress is not chaos, but rather a more pervasive order. A better calendar would help.

Axioms of Calendar Reform

By CHARLES D. MORRIS

(From an Address before the Society of Industrial Engineers, Buffalo, N. Y.)

MOST students of calendar reform will agree, I think, on certain basic and self-evident truths about the practical enactment of a new calendar by the nations of the world. These self-evident truths might well be called the "axioms" of calendar reform, and the application of them to the present international situation should do much to clear the way to definite progress.

Four of these "axioms" can be stated in this form:

1. Calendar reform is an international, not a national, matter, and, therefore, no change can possibly be considered that is not generally acceptable to all nations and peoples.

2. Any new calendar should carefully retain the adequate and desirable features of the present one.

3. Any changes that are made in the calendar should be such as to cause the least possible upheaval and disturbance in the transitional stage.

4. No innovation should be adopted which will introduce greater defects than those which we seek to remedy.

Application of these axioms to the two proposed plans of calendar reform is illuminating, and gives a pretty clear verdict in favor of The World Calendar, and against any 13-month plan.

1. There is definite and determined opposition to any 13-month calendar on the part of a large group of powerful and influential nations; for example, Switzerland, Japan, Italy, Belgium, Germany, Holland, Sweden, England, Irish Free State, and so on. Obviously, on the basis of this first "axiom," the 12-month calendar meets with little if any resistance. It is such a close approximation of the civilized world's present customs and habits that it is obviously preferred by the nations and peoples.

2. If we are to retain the adequate and desirable features of the present calendar, we must immediately list under this heading the division of the year into quarters and half-years. The quarterly unit is of great importance in business of all kinds, and it practically disappears in a 13-month calendar, or becomes so inconvenient that there would be great difficulties in using it.

Another desirable feature of the present calendar, certainly, is the handiness and divisibility of the numeral 12. Use of 13 as a unit of measure is unprecedented; it is a prime number, indivisible, awkward and utterly inconvenient. The real rival of 12 is not 13, but 10, on which our decimal system is based. But nobody wants a decimal time system. All our time measures are based on 12, clocks have 12 divisions, and so have the angles used by navigators and astronomers. The United States Naval Observatory has pointed out how utterly impossible would be a 13-month calendar from the viewpoint of navigators and astronomers.

3. Transition from the present calendar to a 13-month system would be enormously costly and inconvenient. But the proposed World Calendar changes only seven dates in the year, and none of them by more than a notch or two in the calendar: the shift would be imperceptible. The effect of these changes on statistics, history, trade, business and social life must be considered, together with the problems of litigation which are involved.

4. Studies made by Camille Flammarion fifty years ago show very clearly how a 13-month calendar system would inevitably introduce greater defects than those which it sought to remedy. Study of individual trades and professions, made by The World Calendar Association and other bodies, have recently supplemented M. Flammarion's studies with conclusive and detailed information as to the devastating effect which a too-drastic calendar change would have on modern civilized life.

CURRENT PRESS COMMENT

More Practical Plan

Chelsea (Mass.) Record

There appears to be continued agitation over the proposed changes in the calendar, but like all projects of great importance it will take time to bring about any change that will appeal to the public. Of the two propositions, the 13-month and the revised 12-month, or World Calendar, The World Calendar would seem to be more practical. It would be impossible to make quarterly or semi-annual business comparisons under the 13-month calendar, and comparisons are important in business. It has been claimed by some observers that records of the past should be thrown out or disregarded, in view of all the changed methods or customs. This would seem too drastic, although most people will admit that it is the present and immediate future that is of vital interest rather than the past.

Adoption of The World Calendar would involve the minimum of adjustment. Already many people have given approval to the proposed changes.

Help to Advertisers

Editor and Publisher, New York City

Rearrangement of the calendar as urged by The World Calendar Association would help advertisers in two ways, it is argued by Sabine L. Baring-Gould, of the William H. Rankin Company, New York, writing in the Journal of Calendar Reform.

For one thing, he points out, budgeting and accounting of the advertising appropriation would be simplified if each month began always on the same day of the week. At present expenditures in newspapers, weekly magazines or broadcasting may vary as much as 20 per cent from month to month, depending upon the number of Sundays or other preferred days.

More importance, however, according to Mr. Baring-Gould, lies in the possibility of arranging holidays, as far as possible, so they would always fall on Mondays. This, he says, would do much to stimulate consumption — "industry's present greatest need." Among goods that would be helped he lists automobiles, tires, gasoline and oil, clothing, shoes, camping equipment and other holiday articles.

Proposals for a 13-month calendar, however, are frowned upon as decreasing the effective life of advertising in monthly magazines. A number of such monthlies would be bankrupted, the writer says, if compelled to put out an extra issue each year with little likelihood of additional advertising.

Thoughtful Men

Harrisburg (Pa.) Christian Advocate

The Calendar Reform association is one of the most persistent bodies operating today. The leaders have worked out their program and are slowly penetrating into every group of thoughtful men.

Archaic Methods

Pontiac (Mich.) Press

This is a changing world. It can never stand still. It never has and doubtless never will. Every phase of life occupies its place in an evolution that is occurring continually, slowly in some instances, it is true, but occurring nevertheless. Archaic methods, archaic implements are supplanted by the newer and more modern trend. And in this ever-changing phenomenon the Gregorian calendar, which has been in operation since 1582 with only slight changes made 180 years ago, must in time undergo its part.

Few Changes

Management Review, New York City

There exists the possibility that January 1, 1939, will be one of the most important and significant dates in modern times. For on that date a simplified calendar may be placed in operation. Not the much-talked-of thirteen-month calendar, but a calendar of twelve months embodying a few changes whereby each day, week and month of each year will be uniform in that there will be no variation as to day and date from one year to the next. The World Calendar regulates the twelve-month year.

JOURNAL OF CALENDAR REFORM

EDITORS

CHARLES D. MORRIS CARL LIDDLE

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ELISABETH ACHELIS, *President*

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FURTHER progress in the international movement toward the enactment of calendar reform was made in discussions at the Vienna Congress of the International Chamber of Commerce this summer. Representatives of the principal calendar reform organizations were present and their views were informally presented during the crowded week of sessions.

The continued interest of the International Chamber in the subject of calendar reform, which was originally brought to the attention of the League of Nations by this body, was shown in the following resolution, passed by the Transport and Communications Group under the chairmanship of Sir John Sandeman Allen of the British delegation:

"Whereas, the Congresses of the International Chamber of Commerce in the years 1921, 1923, 1925 and 1929 passed resolutions in favor of calendar reform; and

"Whereas, the League of Nations as well as national calendar committees of some nations have been engaged in studying the subject comprehensively:

"The group meeting expresses its appreciation of the progress made in this matter, and asks that the General Committee on Transport and Communications be requested to consider the advisability of appointing a committee of business men and experts to study the different proposals for calendar reform in relation to their repercussions on trade generally, with the object of ascertaining the views of the business world, and if found desirable of making some recommendation on the matter to the Communications and Transit Section of the League of Nations for consideration at their 1935 meeting."

A definite plan for the advancement of a calendar reform program in the Council of the League of Nations is presented in this issue of the Journal by Hayne Davis, a leading authority on international law. Mr. Davis urges that, inasmuch as consultative gatherings of the nations have been held and have shown a sufficient recognition of the need for revision of the calendar, it is time to make a step toward legislative enactment.

FROM THE MAILBAG

I am very much interested in the question of calendar reform, feeling sure that it would be a real service to educational institutions as well as to business and scientific societies. The change is so slight and the advantages so apparent that it seems strange if it cannot be made available.—E. J. Ashbaugh, Dean, School of Education, Oxford, Ohio.

It seems to me that a simplification of the calendar would be of benefit to us in particular and to the world in general.—Prof. Hugo C. Wendel, Long Island Univ., Brooklyn, N. Y.

I have long been an advocate of calendar reform and trust that the movement will eventuate successfully.—Benj. B. Kendrick, The Woman's College, Greensboro, N. C.

I have favored the thirteen-month calendar over the present calendar; but the plan proposed in your pamphlet is much superior to anything yet proposed and I hope the movement may succeed.—B. D. Billinghurst, Supt., Reno Schools, Nevada.

Since calendar reform is an important subject of increasing interest throughout the world, it affords me pleasure to have my name on your mailing list for future issues of the Journal.—A. F. Harman, State Supt. of Education, Montgomery, Ala.

All in our department are interested in calendar reform and we hope the movement will meet with success.—Sister M. Vivian, Head, Dept. of History, Loretto Heights College, Colorado.

I am opposed to the 13-month calendar. Am very favorably impressed with the 12-month calendar, and believe it should and will be adopted soon.—F. A. Hancock, Contractor, Morris, Minn.

It seems to me that the proposed new calendar would be a good thing for all classes of people.—Frank G. Smith, Clergyman, Omaha, Neb.

I like the plan of The World Calendar. The reasons advanced by Mr. Thibault for its adoption are convincing.—W. S. Belden, Meteorologist, St. Joseph, Mo.

I can see nothing but good from the proposed change of calendar reform. The uniformity of the length of months, and the regularity of the same date for the Sabbaths each year, would be a boon for churchmen.—C. A. Weber, Clergyman, New York City.

I was greatly interested in the copy of your Journal which you sent me. Your proposal was a new one to me and seems to afford several advantages over the 13-month plan.—Malcolm R. Eiselin, College of the Pacific, Stockton, Cal.

I wish to assure you that I am intensely interested in the movement for calendar reform.—Charles Henry Haynes, Talladega College, Alabama.

I will be very glad to receive literature on the progress of calendar reform. I have been very much interested in this topic for a long time and hope to live long enough to see the reform accomplished.—Ward C. Moon, Supt. of Schools, Poughkeepsie, N. Y.

I am very much in favor of your proposed World Calendar. Its balance has much to recommend it over our present system.—Robert Millinchamp, Asst. in Agri. Engineering, Macdonald College, Quebec, Canada.

I am in hearty accord with this movement. It is to be hoped that the fruits of your efforts will bear the much needed results.—Geo. Knutson, Agri. Statistician, Fargo, N. D.

Your 12-month calendar looks good to me.—H. R. Lochry, Dairy Products Manufacturer, Sugar Creek, Ohio.

I have been in favor of the 13-month plan but the plan you suggest seems to have more advantages.—Edward B. Richbald, Fruit Grower, Waterport, N. Y.

Since my introduction to The World Calendar, I have been firmly convinced that it is the simplest and the best way of ridding ourselves of the bug-bear we now know as a calendar system.—Frank A. Taber, Jr., Editor, East Aurora, N. Y.

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485 Madison Avenue, New York City

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